

BUILDING JUSTICE PODCAST



CRISJ Building Justice Podcast

Season 3, Episode 19: Something's in the air.

Moderator: Veronica Mozqueda

Guest: Dr. Wayne Linklater

Please note: This transcript may be imperfect. Please contact Veronica Mozqueda directly at vmozqueda@csus.edu should you have any questions.

Music lyrics:

Company under construction, the function, justice for the human family we demand it. Justice, true freedom, equality is a must. Thus, decolonization of the planet. So bust this. People be the power now we're Building Justice. Pulling out divinations, now we're Building Justice. Welcome the planet to the Podcast, "Building Justice," "Building Justice," "Building Justice." Building is to add on, or to do away with.

Intro music lyrics 0:00

We're currently going from construction to function just for the human family. We've just done freedom equalities. decolonization now the plan supports this. People being without the JUSTICE Pulling it says we'll get the nation's justice. Welcome to playing a podcast bill, the justice, justice. Justice bill is to add on or do away with justice.

Veronica Mozqueda 0:33

Welcome to Building justice, a podcast by Sacramento State Center on race, immigration and social justice. We explore critical issues affecting our communities with the hopes of creating a healthier, and more just world. My name is Veronica Mozqueda. I'm a student in the political science graduate program here at Sac State and I'll be your host for this episode. I am joined by Dr. Wayne Linklater, who serves as the Environmental Studies department chair here at Sac State and is also my boss. And today we will be talking about the Sacramento environmental

justice community air monitoring project that we along with a group of students here at Sac State have been working on. I've wanted to begin by asking what initially sparked your interest in getting involved in testing your quality?

Dr. Wayne Linklater 1:24

Well, I wasn't already interested in air quality. I wasn't trained in it actually, I was trained as an ecologist, but a serendipitous telephone call a couple of years ago from the CEO of United Latinos, who was setting up a project to study air quality in Sacramento and wanted University help and wondered if we were interested. So I jumped.

Veronica Mozqueda 1:53

I mean, it's great that they sought the university's assistance in continuing their efforts to expand their sampling capacities. Could you talk a little bit about how the project actually got started.

Dr. Wayne Linklater 2:06

So what United Latinos were trying to do was put together a team of organizations who would apply to a California Department of Justice grant, to support equality monitoring in disadvantaged neighborhoods in the city. These are neighborhoods in the environmental justice zones of the city. They wanted to measure air quality, and to measure the effects, the health effects of air quality, as a way of providing better information, more detailed information to support advocacy for better air quality in those neighborhoods.

Veronica Mozqueda 2:46

Along with the university, what are the other organizations that are involved and how do they fit into this puzzle?

Dr. Wayne Linklater 2:52

Goodness, can I remember them all? I can remember most of them, I think. So. California Breathe, is involved, Valley Vision is involved. The public health department, Sacramento County is involved. You know, Latinos, of course, and several others. The other community organizations are now working to provide health done in collaboration with the Secretary of Public Health and a series of other community based organizations who are conducting the health data. Our role, our team's role in this is to provide the science and to do the monitoring and provide the analysis and the final air quality or air pollution part of the report.

Veronica Mozqueda 3:41

that's so great that our combined efforts will be able to provide a very complete report of what the health of the community looks like, and compare it to the health of the environment in those areas. Let's talk budget, where is the funding for this project coming from?

Dr. Wayne Linklater 4:01

So it could be long story. Should I start with the long story and see how we go?

Veronica Mozqueda 4:08

Sure.

Dr. Wayne Linklater 4:09

So I don't know if your listeners remember, but many years ago, more far more than several actually. Volkswagen the automobile maker was fined by the Department of Justice for misleading consumers about the emissions from its vehicles. They were actually found to be doing something dodgy with their data. And, and they got pinged for, I think several billion dollars, I want to say 6 billion, but I might be wrong about the total.

Veronica Mozqueda 4:42

Oh, wow.

Dr. Wayne Linklater 4:43

It was a lot of money. And so what are the Department of Justice do with that money? Well, they said well, this this money should support efforts to improve air quality, especially in disadvantaged neighborhoods, amongst many other things that they did with the money. And so they've sectioned off a portion of it to support community based research on air quality and health. And so what United Latinos did is they, working with the Department of Sacramento County's Department of Public Health, is they put together this, this consortium of organizations to put in a bid for their money and, and they were successful. And they carved off 2 million, almost \$2 million of that money for this work. And so a lot of that money goes to supporting those community based organizations doing work in the community. And, you know, United Latinos were already doing air quality monitoring in a small way, in the neighborhoods that they work. And but they wanted to expand that pride, hence the telephone call to me. And, and, and then. So a lot of the money goes to supporting those organizations existing work, but also doing the work that that measuring health outcomes for neighborhoods and, and then some of the money a very small portion comes to our team as a contract to do the air quality monitoring.

Veronica Mozqueda 6:11

Well, that's great to know that some of those funds have been actually put to good use. Moving on to sampling. We've been going around to Gardenland, North Highlands, South Sac, Vineyard and Arden arcade. Can you talk a little bit about why gathering data from those specific areas is important and why they've been declared environmental justice zones.

Dr. Wayne Linklater 6:38

Right. So several years ago, the county identified its parts that, that could be classified as disadvantaged neighborhoods. And if I remember correctly, it was Senate Bill 1000. If I've got that number, right, that set aside and well, essentially, delineated these areas. And the purpose of that delineation was to provide or encourage investment in those neighborhoods to improve outcomes for the residents of those neighborhoods. Now, how are they disadvantaged? They are areas where there's been historically lower city and county investment in terms of facilities and infrastructure. They also of course, as you would expect, as in many North American cities, they are also communities of color, predominantly, okay. They have high migrant communities within them for output, they also have low household incomes, and poor health outcomes generally. Our interest in those areas is that they are also areas which are close to commercial industrial sources of air pollution, in particular, are often areas sandwiched between busy arterial routes with high vehicle in a vehicle emissions pollution, or they're near places where they are transport hubs. In the modern city over the last 20 years, what we've seen with E-commerce is the development of

hubs within cities which concentrate heavy vehicle traffic. And a lot of those commercial warehouses, warehouse hubs, Amazon Walmart, they are located in these areas where residential areas which have high use commercial zones, and generally speaking, have poorer environments because of it.

Veronica Mozqueda 8:52

I'm curious to see what the results the data will provide for these underfunded areas with larger minority populations in the community will show. I wanted to talk about the duration of the sampling. How long will it go for and could you explain a little bit about the reasoning behind that?

Dr. Wayne Linklater 9:12

A year's the ideal.

Veronica Mozqueda 9:12

okay.

Dr. Wayne Linklater 9:16

And the reason we're focused on one year is because vehicle emissions and air pollution have both an annual cycle, a seasonal cycle, a weekly cycle and a daily cycle. So by measuring over an entire year, we're hoping to capture all that variation. And the seasonal cycle, of course, is driven by things like weather conditions, when it's cold in Sacramento, it's often also still and the bad air or the toxic air sits in the belly and accumulates. Okay, so we expect worse with air conditions in the winter. And for it to be better when it's a little bit windier when the Delta breeze is blowing, the air quality improves a little. So that's the seasonal cycle. The weekly cycle, of course, is driven by traffic. Right? So we expect that traffic when traffic is worse Tuesday through Thursday, each week, especially post COVID that's particularly true. Not nearly as bad on Monday and Fridays these days. So it used to be, we expect to be worse in the middle of the week, and not so bad on the weekends. Although, Saturdays can be so high with other sorts of traffic, but particularly Sundays, and traffic declines, and has better air quality around roads, freeways, highways. And then the daily cycle, of course, is also driven by traffic. That's driven by the morning commute and the evening commute. So we're interested in all that variation and capturing it and being able to plot it and understand where the highs and the lows are, and how bad or good they are.

Veronica Mozqueda 11:02

I'm interested to seeing what our results are after the year of sampling, I actually didn't know that it was potentially worse in the winter, when there wasn't too much movement in the atmosphere.

Dr. Wayne Linklater 11:14

It could also be worse in the summer. Some of your listeners will have heard about the heat island effect. And that is in cities, especially cities in this part of the world, in continental climates. Cities heat up and that hot air actually produces a sort of cap over the city. And, also can trap pollutants. So the combination of hot air, and pollutants can drive peaks and poor air quality as well. I can say more, because we also expect these days, we also expect a wildfire season. And so coming into winter through fall, we might get poor air quality, or pollutants

coming in from outside the city and sitting in an environment and deteriorating air quality as well. So all we see all the seasonal variation we hope to capture and measure

Veronica Mozqueda 12:14

are we going to be comparing or sort of including that with the different sort of natural disasters that potentially happen?

Dr. Wayne Linklater 12:21

Certainly if there are events like a local wildfire, which circulates poor air quality into the valley and down through the valley, or up through the valley, in Southern California. Yes, we'll be picking up those trends. It's, it's part of the reason why we chose the pollutants that we chose to measure.

Veronica Mozqueda 12:40

I'm so anxious now to begin the data analysis so we can compare what the different seasons of the year look like. I've wanted to move on to the devices that we use. So we're using two devices, the first we refer to as DS-tech, could you tell us what this device measures? And what are some of the unique features about it.

Dr. Wayne Linklater 13:04

So DS-Tech is a company. The device is named Distributed Sensor Technology. And what's remarkable about this technology, from my perspective, I'm sure the manufacturers that make this think it's remarkable for other reasons. But, for me, the remarkable thing about technology is, is it allows us to measure air quality in real time with using a handheld device that we can move around the city with. And that's that's an incredible advance. And the other remarkable thing about the DS- Tech is that it measures black carbon in the air. And we're particularly interested in black carbon, because and I shouldn't say measures with some precision and accuracy, which is important, which is important to note because historically, not all air pollution sensors or devices were any good at measuring. They gave an indication but they actually weren't accurate, and not particularly precise either. But this new technology is accurate and precise for black carbon. And so it's a big advance. And so yes, it measured by carbon, and we're particularly interested in black carbon, because black carbon is generated most by heavy vehicles, especially diesel vehicles. Diesels a dirtier fuel, it produces soot, which is essentially what I mean by black carbon. They're not quite the same, but for the purposes of this conversation, soot and black carbon are similar. And so soot is a very heavy pollutant. And of course you can imagine, like cigarette smoking, when it gets into your lungs, it's, it's terrible for the lung tissue. So it's a nasty pollutant About 40% of black carbon in the atmosphere comes from heavy vehicles, diesel generating trucks, mainly. The other big source of black carbon in the atmosphere is wildfire smoke, as you can imagine. You know, wildfires generate big airflow really cause heavy, sooty smoke which ends up being distributed, spread widely in the wind. So that's DS-Tech..

Veronica Mozqueda 15:29

I can definitely speak to the portability of this device, it's been amazing to be able to just grab it and go. The second device that we use, we call TARTA and it's my personal favorite device to

use. Could you tell us one where we sourced it, what it measures and what makes this device so incredibly unique?

Dr. Wayne Linklater 15:51

Yeah, so I'm glad you like working with TARTA, it's actually not the easiest device to work with, because it's a device really still in development. So, I learned about TARTA, which I should tell you what it is. It's Toxic Metal Aerosol Real Time Analysis. That's what it stands for. And what that means is that it's measuring metals in the air as it measures them. We found we got this device from Ton Wexler's lab at UC Davis. It's a it's it was a piece of technology in development, it was largely developed by a woman called Hanyang Li, who now works at UC San Diego. And she's been very helpful in helping us use this piece of developing equipment. She'd like, of course, to see it used so that, so that they can improve on it and, and see it's, see its benefits. And we'd like to use it because it allows us to measure heavy metals, which is something that's remarkable. Previously, if people wanted to measure heavy metals in the atmosphere, in the air we breathe, they would have, they would have had to rely on equipment that is so big and so expensive that they, they'd be doing it in just one place. So there are actually only a handful of places around the United States which measure heavy metals, and are very expensive. And because they're so big and expensive they're not very common. So this device is about the size of a small suitcase, right? As you know. It's a little heavy for a suitcase, it's about 40 pounds. But nonetheless, it's possible to put that in the back of your car and drive to places in the city and measure the heavy metals in the air. It's important because heavy metals are among the most toxic things to us. And many of you listeners will already be familiar with controversies over lead and water, or lead and paint, or lead and gasoline. Lead is a heavy metal. It's particularly nasty when it encounters neurological materials, so your brain or the nerves that make your muscles move and it results in a series of diseases which are very debilitating. And they're particularly awful for young developing people, so children. And so, but lead is not the only one, a lot of metals are toxic like that. Cadmium, chromium, aluminum, copper, zinc, all these metals are potentially highly toxic. And at the moment, we understand only very poorly, how they're distributed in the environment, and what role vehicle emissions play in in generating high levels of metals in the air we breathe. The metals that we're interested in those that come from not just the vehicle emissions, but also the wear and tear. So you imagine vehicle moving down the road. It's not just what's coming out the tailpipe that's potentially toxic. It's also the dust that comes from things like brake pads, and the wear and tear in the engine, and the combustion of lubricants in a hot engine. And so those heavy metals are things like cadmium, and chromium, zinc, aluminum. I'm going to miss one, I know. Things like nickel and copper. All of these metals are actually parts of cars, parts of their moving parts and, and when, and as they move along the road they come off as dust or even flakes and aerosolize into the atmosphere and get breathed in.

Veronica Mozqueda 19:54

Well, that sounds terrifying.

Veronica Mozqueda 19:56

Doesn't sound very nice does it?

Veronica Mozqueda 19:57

No it doesn't! Um could you talk a little bit about the uniqueness about the way that we're gathering samples for this project in comparison to other studies?

Dr. Wayne Linklater 20:10

So what's, what's neat about this is, it just comes down to the size of the devices we're using. So previously, when, when organizations government, for example, have measured air quality, first place a handful of monitoring stations.

Veronica Mozqueda 20:24

Okay.

Dr. Wayne Linklater 20:25

Especially for the things we're interested in black carbon, and, and metals they have placed these large monitoring devices in a city, and they might only have two or three. And then to estimate the sorts of, of air pollution that's happening in different parts of the city, they extrapolate or they interpolate. That is they create models to kind of predict how air pollutants might move through the city and where they might concentrate and where they might not. And as you can imagine, that's great. But it's not very exact, or it's sort of it's, it's a prediction, more than it is a reality, right? What we're able to do with these devices that are small enough for us to be able to drive around with or walk around with, is we're actually able to go to neighborhoods, and measure what's actually happening on the ground in terms of air quality. Now, I do expect that we will probably discover that a lot of the predictive models created from these larger, more expensive devices are reasonably good. But I also expect our measurements to improve on them at the local at the neighborhood at the micro scale. And so I expect us to learn some new things about how air pollutants move and concentrate within neighborhoods. Because no one no one's been actually going to neighborhoods, and measuring these things. They've been supposing what they are based on models from a few larger expensive devices placed in key places around the city, whereas we're driving through neighborhoods. And in no route is the same as you know, we have different routes every time. So we're building up a dataset with samples from everywhere in those environmental justice.

Veronica Mozqueda 22:15

What are the advantages about sampling on such a small scale? And can you talk about potential disadvantages?

Dr. Wayne Linklater 22:24

Yeah, so just so just to affirm the advantage is that we get to measure what's actually happening at a fine scale in the city. And that's rare. It's been done most recently for things like particulate matter. I'm/, thinking of the, the efforts like purple ear sensors, and clarity sensors that lots of people are involved with putting in and around the city. And those things may measure things like particulate matter, which is finer than the soot or black carbon. And they also measure nitrous oxides, which we're also doing. But not the heavy metals, and the black carbon. And I think, I think the advantage, the advantage is that we expect to be able to improve on those more general models with real on the ground data. The disadvantages, the disadvantages, is just one of logistics, right? Actually keeping a team of people in equipment functioning, and having them visit neighborhoods, and gather data is actually a really time consuming exercise. It's not too

expensive, at least the way we do it. It's not too expensive. It couldn't be expensive. That's another advantage. I imagine. That's another advantage. Although, although I'd like to pay you all more.

Veronica Mozqueda 23:53

I mean I wouldn't be opposed to that!

(laughter from both)

Dr. Wayne Linklater 23:56

I'd like to, but I can't because we have a we have a pretty limited budget. But so some of the disadvantages are that it's very people intensive. And maintaining that effort. It could only really be done on the scale, that we're doing it over the course of a year. I wouldn't like to do it for much longer. I think I think we'd want to, we want to substantially increase our budget, and probably I would want to hire someone who just organizes. So yeah, so there's a trade off. But yea, it's been fun!

Veronica Mozqueda 24:30

Yea, I've been enjoying it so far. But that's one great, the the sampling that we're doing isn't as or it's more cost effective than others enroll people to get really precise readings compared to others. Do you think that potentially, once we analyze our data, and once you've published it, do you think that that might sort of change how others do, or do you think this might be something that others might adopt later. Just speculating.

Dr. Wayne Linklater 24:58

Oh, yeah, I, I don't think it's all that much of a speculation actually. For the same reason that we adopted these technologies, I think other groups will do it too. It's, it's, we're on a trajectory with the technology now, where its accuracy and precision is improving and it's becoming easier for public groups to use and, and to move around with. So I think the quality of the data, and the breadth of the data is only going to improve people and because people are going to adopt the technology, like any technological improvement. Yeah, I think I think the quality of information we have about air pollutants is going to be a whole lot better over the next 5, 10 years.

Veronica Mozqueda 25:41

I mean, what a privilege that we have this opportunity to build on the research, from data gathered by devices that are stationary, because we have access to devices that we can take through the neighborhoods, they're portable, and will be able to provide us with a very accurate depiction of what the health of the environment in those areas looks like. I mean, it's really incredible. I wanted to circle back, could you talk a little bit about the sampling that the other organizations are doing for this project?

Dr. Wayne Linklater 26:17

So at the moment, our partners in the work are sampling neighborhoods, communities within the environmental justice signs, and asking them questions about their household, individual respiratory health and asking them about their experience of air pollution too. And our hope is that we can make sense somewhat of both the quality data and the health data by bringing those

two data sets together. Our expectation, of course, our hypothesis is actually that where the air quality is worse, there are also worse health outcomes. But there'll be some nuance in that general trend that will be interesting. So the air quality data is going to be subject to a geographic information systems analysis. And what I mean by that is that basically, it'll just be mapped. We'll map the air quality data across the city, and we'll also map all the things that we think have a substantial influence on the air quality. Things like climate, microclimates, things like traffic levels, things like the distance from a major arterial route, or a transport hub, and all those sorts of things, so that we can come up with an explanation for why the air pollutants are worse in some places, and better and others. And also, perhaps an explanation for why some neighborhoods suffer more from air pollution than others do.

Veronica Mozqueda 27:59

And then you're gonna be authoring a report after we finish, can you tell us a little bit about that report

Dr. Wayne Linklater 28:04

It'll be a collaborative report with the lead partners. But the purpose of the report mainly is to, is once we've brought all this data together and looked at their relationships, and the causes, amongst all the factors that might drive evolution, and neighborhood respiratory health, is to be able to provide that report and the information to local neighborhoods and communities, so that they can use those to advocate for themselves for better air quality in their neighborhoods. That's the hope, that the providing better information actually improves their argument for greater investment in their neighborhoods, for better environments, especially with regard to air pollution. If we managed to, I think, generally speaking, capture the variation across the year and air quality so that we can tell people when it's worse, and when it's not, and what reductions in air pollutants might be possible, or where the attention should be placed. And if we can say something intelligent about what the implications of that barrier is for people's health, then I think communities using that information can be more convincing to their politicians and their community leaders about the need for more attention in this area and, and perhaps some improvements, some investment in ways that might, might actually lower air pollutants in the atmosphere.

Veronica Mozqueda 29:37

Finally, I would like to ask you, what impact do you hope this study is going to have on the community?

Veronica Mozqueda 29:47

I'd like to see Sacramento engage with greater interest and energy in developing way Is of improving air quality in the county's disadvantaged neighborhoods. There is already a general trajectory towards better equality. And that's good. Some of that's because of, of people already working quite hard on this problem. And California government generally has been really working hard on this problem. I mean, California and cities are amongst the worst in the country for air quality. And that's because so many people live here and drive so many cars. Right? And but they are making improvements, right? I mean, the air quality today is is substantially better than what it was 20-30 years ago. But, oh and, I should say, and the trajectory of the technologies is that air quality is going to improve because we are polluting less at least in terms of vehicles.

Vehicle electrification is going to completely transform that. It won't remove all the air pollutants, but it will reduce some of them a lot. For example, electric cars have fewer moving parts, so they're probably less likely to introduce heavy metals into the air. They also have fewer emissions, so they're less likely producing black carbon. If we can have, if we can use electrification to replace diesel vehicles, it's less likely than gasoline vehicles, right? Over the long term. Because the heavier vehicles are harder to electrify. Anyway, that's, that's another story for another time. So, the trajectories are good. But despite that, there are still communities within the city where air pollution doesn't receive the attention. And, and that's the communities where it's worse. So, we need to I think we need to double down on our investment in improving air quality and make sure that everyone benefits from those improvements, not just the few who live in places where most people drive electric cars, for example.

Veronica Mozqueda 32:10

Well, thank you so much, Dr. Linklater, for coming onto the podcast with me. And we would like to thank everyone listening for giving us your time today.

We hope our ongoing conversations spark understandings, empathy, ease and motivation to join the struggle for a better future for all.

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Outro Music Lyrics

No more penalties and no more wars. Based on the actions. Now, time for "Building Justice," "Building Justice." Time for building justice, justice.